

Abstract

The subject invention concerns a composite comprising an organic fluid-swellable, fibrous matrix, such as collagen, and a mineral phase, such as calcium carbonate or phosphate mineral phase, for use as a biomimetic of bone. In another aspect, the subject invention concerns a process for making a composite involving the inclusion of acidic polymers to a supersaturated mineralizing solution, in order to induce an amorphous liquid-phase precursor to the inorganic mineral, which is then absorbed (pulled by capillary action) into the organic matrix. Advantageously, once solidified, a high mineral content can be achieved, with the inorganic mineral crystals embedded within the collagen fibers (intrafibrillarly) and oriented such that they are aligned along the long axes of the fibers of the organic matrix, thereby closely mimicking the natural structure of bone. The present invention further concerns a method of treating a patient suffering from a bone defect by applying a biomimetic composite to the bone defect site.